

**Remarks/Arguments:**

These remarks are directed to the final Office Action of March 24, 2010 and a subsequent telephonic interview with the examiners. The undersigned and the Applicants thank Examiner Jeffrey T. Palenik and Supervisory Patent Examiner Robert A. Wax for their courtesy during the telephonic interview on July 22, 2010.

During the interview, the rejections under 35 U.S.C. § 102 and 35 U.S.C. § 103 were discussed. Specifically, the undersigned and the Applicants explained the distinctions between the compounds prepared by the claimed invention, which utilize a polycarbodiimides as a reactant, and those prepared by the cited Chapin reference. The undersigned and the Applicants thank the Examiners for discussing the present invention and for proposing suggested testing, in view of the Chapin reference, to further explain the distinctions and support the Technical Declaration filed herewith. The undersigned and the Applicants have completed such testing and detail below the distinctions further shown by the test results. The Applicants respectfully request reconsideration and assert that the application is in condition for allowance.

Claims 1-31 were pending in the above-identified application. Claims 23-30 were previously withdrawn. Claims 11 and 12 are amended in this Response to overcome rejections under 35 U.S.C. § 112, second paragraph. Support for these amendments can be found in the application as filed. For example, support for the amendments to claims 11 and 12 can be found at least at Page 1, Paragraphs [0013-0014]; Page 2, Paragraph [0018]; and in the Examples at, for example, Table 12; among others. No new matter has been added. Accordingly, claims 1-22 and 31 remain pending and under consideration.

**Claim Rejections Under 35 U.S.C. § 112**

Claims 11 and 12 are rejected under 35 U.S.C. § 112 as indefinite and failing to particularly point out and distinctly claim the subject matter of the invention. The Office Action states that the phrase "the carboxyl-terminated copolymer" in the first line of each claim lacks antecedent basis in claim 1, the claim from which claims 11 and 12 depend. To expedite

prosecution, claims 11 and 12 have been amended to recite that "the carboxyl-terminated polymer is the reaction product copolymer of a mixture of alkylene oxides..." with appropriate antecedent basis to claim 1.

Support for these amendments can be found in the application as filed. For example, support for the amendments to claims 11 and 12 can be found at least at Page 1, Paragraphs [0013-0014]; Page 2, Paragraph [0018]; and in the Examples at, for example, Table 12; among others. No new matter has been added. Withdrawal of the rejection of claims 11 and 12 is respectfully requested.

**Claim Rejections Under 35 U.S.C. § 102 and 103**

Claims 1-3, 6, 10-16, and 18-22 stand rejected under 35 U.S.C. Section 102(b) as anticipated by Chapin et al. (U.S. Patent No. 4,594,380, herein referred to as "Chapin"). Applicants traverse this rejection for the reasons given below.

Claim 1 of the present application recites "a continuous release composition comprising an elastomeric matrix and at least one active agent, ... said matrix being the reaction product of a carboxyl-terminated polymer with a polycarbodiimide." Simply put, Chapin does not teach reacting a carboxyl-terminated polymer with a polycarbodiimide. Chapin teaches a polyurethane elastomer formed by a process which reacts a polyol with an isocyanate. The polyol comprises a major component and a minor component, with the major component typically making up at least 90% by weight of the polyol and selected from a group of hydroxyl-terminated compounds including polybutadiene. The optional minor component is selected from a group of carboxyl-terminated compounds including polybutadiene. The isocyanate is selected from the group consisting of the aromatic, cycloaliphatic, aliphatic, and heterocyclic isocyanates, and mixtures of two or more of the above. (Chapin, Col. 3, Lines 7-30).

Chapin does not teach, as the Office Action asserts, a matrix formed by reaction of a carboxyl-terminated polymer with a polycarbodiimide. As is understood by one having ordinary skill in the art, isocyanates are not polycarbodiimides - they are one possible reagent used in the formation of polycarbodiimides. Chapin teaches that a polyol is reacted with an isocyanate

to form a polyurethane. Claim 1 of the present application recites that a carboxyl-terminated polymer is reacted with a polycarbodiimide to form a polyurethane. The fact that polycarbodiimides can be produced from isocyanates is completely irrelevant to the claim language currently pending. Claim 1 recites the reaction of two reagents. Chapin is completely silent as to the reaction of the two reagents recited in claim 1. Accordingly, Chapin fails to teach every element of claim 1. Claims 2-22 and 31 depend, either directly or indirectly, from claim 1 and thus include all of the limitations of claim 1. Applicants thus respectfully request reconsideration and allowance of claims 1-22 and 31.

During the telephonic interview on July 22, 2010, the Examiners stated that claims 1-22 and 31 of the present invention would be obvious over Chapin in view of Brown et al. (U.S. Patent No. 3,835,098; herein referred to as "Brown"). Brown was cited as teaching that diisocyanates are used to produce unhindered aromatic polycarbodiimides. As noted above, one having ordinary skill in the art knows that isocyanates are not polycarbodiimides. Isocyanates, such as those disclosed by Brown, are just one possible reagent used in the formation of polycarbodiimides. Similarly, one having ordinary skill in the art understands that the matrix produced by reacting a polyol with an isocyanate is not the same as the matrix produced by reacting a carboxyl-terminated polymer with a polycarbodiimide, as claimed by the present invention.

The reaction of the components disclosed in Chapin with those disclosed in Brown, namely isocyanates, would completely fail to achieve that which is achieved by the currently claimed invention. As noted in the Declaration filed herewith pursuant to 37 C.F.R. §1.132, the reagents of the current invention do not interact with any hydroxyl (-OH) groups which may be present with the active agent contained in the product matrix. Indeed, the polymeric matrix of the claimed invention, formed by reaction between carboxylic-acid-terminated polymer and a polycarbodiimide, is formed despite the presence of any -OH group present with the active. The chemistry of the cited art is very different from that of the claimed invention based on the reactivity and capability of polycarbodiimide, as is known to one having ordinary skill in the art. This distinction is further detailed in the Declaration filed herewith.

This distinction is also discussed in the specification as filed. For example, it is noted that forming a polyurethane by methods known in the art at the time of the present invention required polyols to react with isocyanates. As it is stated in the specification, unfortunately many active ingredients for sustained release contain alcohol functionality which competes with such polyols in the curing reaction. As a result, the polyurethane gel formation is hindered in the presence of alcoholic active ingredients in processes which react polyols with isocyanates. (Specification, page 1, paragraph [0003]). For example, many fragrances and biologically or nonbiologically active ingredients contain alcohols as diluents or a part of the active agent. As is known in the art, the presence of alcohol would compete with the matrix polyols for the polyisocyanate reaction in the processes taught by Chapin. The claimed invention does not have this problem because it takes advantage of the facile reaction between polycarbodiimide and polycarboxylic acid, at extremely mild conditions, to form a crosslinked network regardless of the presence of alcohol in the active agent.

Combining Chapin, which teaches the preparation of a polyurethane by reacting a polyol with a polyisocyanate, with Brown, which discloses that polycarbodiimides are prepared by polymerization of organic diisocyanates, would not produce the polyurethane matrix of the present invention because the reactions in Brown would not occur at the operating conditions of Chapin. Accordingly, the polymerization of diisocyanates, as taught by Brown, to produce polycarbodiimides *in situ* does not occur during the reaction conditions of Chapin. This has been confirmed via technical analysis by an inventor of the present invention.

Example 1 of Chapin teaches the reaction conditions for the process of producing a matrix. Specifically, Example 1 states that a polybutadiene (Poly BD, R-45HT) and a dibutyl-tin dilaurate (T-12), a catalyst, are introduced to a 10 liter closed reaction vessel at room temperature. After stirring for about 5 minutes, a polymethylene-polyphenyl isocyanate (PAPI 94) was added, and the mixture stirred again for about 5 minutes. A portion of the mixture is then poured to form a gelled slab. The resulting polyurethane material was then analyzed. Similar materials were produced with and without active agents. (Chapin, Example 1, Col. 10, Lines 10-35). This is discussed in further detail in the Technical Declaration attached hereto. The declarant followed the procedure disclosed by Example 1 of Chapin and found that no

polycarbodiimides were formed *in situ* by the isocyanate during the reaction conditions of Chapin.

Additionally, the network formation kinetics and resulting linkage of Chapin is substantially different from the claimed invention, which describes the reaction between carboxylic acid and carbodiimides. The process of Chapin results in a polyamide urethane linkage at an elevated temperature, if any, while the process of the claimed invention results in an N-acyl urea linkage. The N-acyl urea linkage is only formed by the reaction between carboxylic acid with carbodiimide functionality at room temperature. Although polyisocyanate is the starting material or precursor leading to carbodiimide, the carbodiimide can not be produced under the reaction conditions of Chapin. As is well known in the art and further discussed in the attached Technical Declaration, carbodiimide can only be formed in the presence of special catalysts and under high temperature to accelerate the elimination of one carbon dioxide from two isocyanate functionalities.

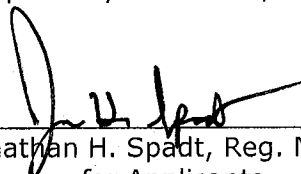
The product composition of the claimed invention has further benefits not achievable by the cited art. For example, the mild reaction temperature enabled by the claimed invention is also an important distinction from Chapin and the other cited art. Any heating during the preparation of the crosslinked network risks the loss of a portion of key and volatile active ingredients, which often render the final product unwanted or ineffective for its purpose. This is particularly important in sectors such as the fragrance industry. This functionality of the claimed invention enables better utilization of hydroxyl-functionalized ingredients, which are often essential in the final performance of the active agent in fragrance packages.

The claimed invention is distinguished from the cited art for at least the reasons described above. Dr. Chao, an inventor of the claimed invention, has attested to these facts and has provided a signed declaration, under 37 C.F.R. § 1.132, filed herewith in support of this Response. Chapin, by itself or in view of Brown, does not disclose what is recited in claim 1. Claims 2-22 and 31 depend, either directly or indirectly, from claim 1 and have all of the limitations of the independent claim. Accordingly, in view of the claim amendments and remarks, Applicants respectfully assert that claims 1-22 and 31 are allowable and that the application is in condition for allowance, which action is respectfully requested.

## Conclusion

Withdrawal of the rejections of claims 1-22 and 31, and reconsideration and allowance of the claims are respectfully requested. The Examiner is invited to contact the Applicants, through the undersigned, if the Examiner believes doing so will expedite prosecution of the application. In view of the claim amendments and remarks, Applicants respectfully assert that the application is in condition for allowance, which action is respectfully requested.

Respectfully submitted,



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